LEAK DETECTION / LOCATION SURVEY REPORT
FOR
THE CITY OF MARION

May 1, 1996 -- May 31, 1996

By

John E. Gapinski and James R. Shipley
of the
EDWARDS AQUIFER AUTHORITY
Division of Planning and Environmental Management
Leak Detection / Location Program
August, 1996

Edwards Aquifer Authority
1615 N. St. Mary's
P. O. Box 15830
San Antonio, Texas 78212-9030
210-222-2204
Dear Mayor Hild:

We are pleased to submit this final report of the leak detection survey performed on City of Marion’s water distribution system. This report lists findings by separate categories for your convenience.

The Edwards Aquifer Authority (Authority), formerly the Edwards Underground Water District appreciates the cooperation and assistance the city has provided during the survey. Special thanks to Public Works Supervisor, Manuel T. Martinez, for his attention and patience during the survey. The Authority hopes that the information provided herein will be beneficial to the City in identifying and targeting areas of actual water loss and potential water loss.

This survey has demonstrated the water saving potential of the Leak Detection Program. Maintaining the best possible program is vital in order to continue the successes realized. For this reason, the Authority is soliciting your comments, both positive and negative, and any suggestions you may have on how to improve our program.

Please respond to this request candidly, as the Authority cannot improve on deficiencies or support positive measures without the knowledge of such conditions.
Please convey our commendations and thanks to David Koepp and Walter Farias for their assistance in this project. The Edwards Authority sincerely appreciates your water conservation efforts. Should you require additional information regarding this report or have any water related questions, please do not hesitate to call.

Sincerely,

John E. Gapiński
Leak Detection Technician I

James R. Shipley
Leak Detection Technician II

JEP:JRS/ bmc
Enclosures

002jrs
TABLE OF CONTENTS

On March 15, 1996, the Edwards Aquifer Authority (EAA), formerly the Edwards Underground Water District, received a request from the City of Marion to perform a leak survey on its water distribution system. A productivity assessment was performed in February and it was agreed that the EAA would perform some leak detection on all available above ground and pressure reducing valves located as needed. A final report including any potential system improvements to the City of Marion was submitted in September of 1996.

RECOMMENDATIONS AND COMMENTS

ENCLOSURES TO REPORT

A. Revised Master Water System Distribution Plats
SUMMARY

On March 15, 1996, the Edwards Aquifer Authority (EAA), formerly the Edwards Underground Water District received a request from the City of Marion to perform a leak detection / location survey on its water distribution system. A pre-survey conference was held April 4, 1996 at the City of Marion to discuss the work to be performed. It was agreed that EAA would perform sonic leak detection on all available access points and computerized leak location as needed. A final report, including any unusual system condition found and an updated master water plat would be submitted to the City of Marion by EAA at the conclusion of the survey.

John E. Gapinski of EAA began the survey on May 1, 1996, and the survey was concluded on May 31, 1996. Over the course of the survey, a total of 817 access points were surveyed including 615 customer service connections, 34 fire hydrants, 158 valves, and 10 other access points covering 25.42 miles of distribution and transmission main.

Fourteen utility side leaks and eleven customer side leaks were detected for a total of 25 leaks. The utility side leaks included 4 service leaks, 7 meter box leaks, 1 fire hydrant leak, and 2 main leaks. An estimated 14,697 gallons of water per day has been saved by the repair of 14 utility side leaks as of June 15, 1996. The leaks discovered during the survey range from 3,960 gallons per day to small meter box leaks.
DISCUSSION

A. Total Access Points Surveyed: 817

The following is an outline of the various access points used during the survey:

- Customer Service Connections: 615
- Main Valves: 158
- Fire Hydrants: 34
- Others: 10

B. Total Miles of Distribution Main Surveyed: 25.42

C. Total Leaks Detected: 25

Service line, fire hydrant, and main leaks were located by acoustic leak detection, or by visual inspection. Meter box leaks and customer side leaks were located through house to house surveying.

I. Meter Box Leaks: 7

- 121 Seidel Street
- 301 Meadow Drive
- 316 Seguin Street
- 108 East Kreuger Street
- 302 Barnett Street
- 314 Kreuger Street
- Creek Road

<table>
<thead>
<tr>
<th>Street</th>
<th>Repaired</th>
<th>GPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>121 Seidel Street</td>
<td>2/5/96</td>
<td>43</td>
</tr>
<tr>
<td>301 Meadow Drive</td>
<td>6/18/96</td>
<td>60</td>
</tr>
<tr>
<td>316 Seguin Street</td>
<td>5/30/96</td>
<td>60</td>
</tr>
<tr>
<td>108 East Kreuger Street</td>
<td>6/18/96</td>
<td>17</td>
</tr>
<tr>
<td>302 Barnett Street</td>
<td>6/18/96</td>
<td>9</td>
</tr>
<tr>
<td>314 Kreuger Street</td>
<td>6/18/96</td>
<td>4</td>
</tr>
<tr>
<td>Creek Road</td>
<td>6/17/96</td>
<td>45</td>
</tr>
</tbody>
</table>

II. Service Leaks: 4

- # 14 Wild Coyote Lane
- # 22 Wild Coyote Lane
- 1711 Old Marion Road
- 509 F.M. 465

<table>
<thead>
<tr>
<th>Street</th>
<th>Repaired</th>
<th>GPD</th>
</tr>
</thead>
<tbody>
<tr>
<td># 14 Wild Coyote Lane</td>
<td>6/13/96</td>
<td>3,960</td>
</tr>
<tr>
<td># 22 Wild Coyote Lane</td>
<td>6/14/96</td>
<td>34</td>
</tr>
<tr>
<td>1711 Old Marion Road</td>
<td>5/9/96</td>
<td>3,960</td>
</tr>
<tr>
<td>509 F.M. 465</td>
<td>5/30/96</td>
<td>3,960</td>
</tr>
</tbody>
</table>

III. Main Leaks: 2

- La Vernia Street @ Seguin Street
- Wild Coyote Lane

<table>
<thead>
<tr>
<th>Street</th>
<th>Repaired</th>
<th>GPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>La Vernia Street</td>
<td>6/17/96</td>
<td>25</td>
</tr>
<tr>
<td>Wild Coyote Lane</td>
<td>6/13/96</td>
<td>1,080</td>
</tr>
</tbody>
</table>
IV. Fire Hydrant Leaks: 1

Hackberry Street @ Seguin Street
Repai red 5/9/96 1,440 GPD

V. Customer Side Leaks: 11

221 Wetz Street
218 Seguin Street
307 Kreuger Street
104 Seguin Street
211 La Vernia Street
Baseball Field
313 South La Vernia Street
New House On Schulz Street
Bank on F.M.78
Savanah Church
335 San Antonio Street

Notified By Door Tag
Notified By Door Tag
Notified In Person
Notified In Person
Notified In Person
Notified In Person
Notified In Person
Notified In Person
Notified In Person

D. Total Estimated Water Saved by Repair of Detected Utility Side Leaks in Gallons Per Day As Of June 15, 1996: 14,697

Leakage estimates for service lines and mains are based on hole size and system pressure in pressure per square inch. This information was furnished by City of Marion personnel when EAA was not on site at the time of repair.

<table>
<thead>
<tr>
<th>Meter Box:</th>
<th>238 GPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service:</td>
<td>11,914 GPD</td>
</tr>
<tr>
<td>Mains:</td>
<td>1,105 GPD</td>
</tr>
<tr>
<td>Fire Hydrant:</td>
<td>1,440 GPD</td>
</tr>
</tbody>
</table>

Customer leaks were generally small. No attempt was made to estimate this leakage. Customers were notified by door tag or in person when possible or will be notified by City of Marion personnel.

E. Miscellaneous

Henke @ Wald Road
South of Weil Road and west of Creek Rd.
200 Meadow Drive
308 Meadow Drive

Meter needs change out.
Four inch cast iron main exposed in bar ditch.
Unable to locate valve.
Valve stack needs repair.
F. Master Water System Distribution Plats Included With This Report

The water distribution plat for the City of Marion's service area inside the city limits has been revised by EAA. The City of Marion's Water Distribution System & Certified Service Area plat and the surveyor's field notes were used as a guide. This section of the service area has been divided into two 24" x 36" plats with a scale of 1" x 200'.

The three plats depicting the water transmission main from the Comal County well site to the city limits were hand drawn by EAA. Green Valley Special Utility District and New Braunfels Utilities water distribution plats were used as a guide to develop these 24" x 36" plats with a scale of 1" x 400'.

These plats have been drawn to reflect what was found in the field survey. All main line locations, main sizes, and types of material were furnished by City of Marion personnel. The Edwards Aquifer Authority does not certify the scale, or the accuracy of these drawings or their content.

All mains were surveyed from all available access points.

All valves were surveyed. When direct contact could not be made a probe rod was used.

Fire hydrants depicted as fire hydrants without lead valves are hydrants where the lead valve could not be located or does not exist.

All mains, services, fire hydrants, and valves added to the plats are for access point accounting. The location and placement of these items on the plats are intended to indicate what was actually found during the field survey. Placement of main valves on the plat is the surveyor's best guess of what they control. Every effort was made to ensure the accuracy of these plats, but EAA does not guarantee their accuracy.
RECOMMENDATIONS AND COMMENTS

Revise master water distribution plats from “As built” plans, EAA plats, and utilizing the knowledge and expertise of long term field employees. Master plats should show locations of all main valves, fire hydrants, blow off valves, drain or flush valves, air relief valves, and pressure regulating valves. Revised plats should be made available to field maintenance personnel for use in the operation and maintenance of the water distribution system.

Placement of well flow meters should be checked against meter manufacturer specifications for recommended straight pipe lengths both upstream and downstream of meter. All meters have limitations due to piping configurations. An improperly located or installed meter will degrade the inherent specified accuracy below an acceptable level. Meters installed in close proximity to a bend, valve, or other fitting that is likely to disturb the flow conditions at the meter could invalidate the manufactures meter calibration. EAA recommends that all well meters and a percentage of large commercial meters be tested in place yearly for accuracy.

Install meters and check valves on pre-lubrication lines at all wells for water use accounting. Establish accounting system for water used for fire fighting, sewer cleaning, main flushing, etc.

During the course of the survey, EAA noted numerous residential meters in need of replacement. We recommend the initiation of a system-wide customer meter maintenance program. System meters should be upgraded through an ongoing meter change out program. This program should involve replacing a specified number of meters each period with new or rebuilt meters, until all system meters have been replaced.

All meter installations should be reviewed to determine whether the meter is properly sized and the correct type for the current use and flow demand.

Water meters are designed to deliver a maximum flow for a short period and a lower flow for long periods without sustaining damage or above normal wear. If a meter is operating outside its intended range, it cannot register all flow, even though it may be calibrated.

Consider connecting the following four existing mains along F.M. 465: The two inch main south of Carranza Ln. to the two inch main north of Seidel St., the six inch main south of Seidel St. to the six inch main north of Meadow Dr., and the six inch main at Meadow Dr. to the six inch main on Wetz St.
Physically separate the abandoned Creek Road well from the water distribution system. This cross connection has the potential for water loss if valve failure occurs on the existing well header.

Review the existing water distribution system and planned water system improvements to ensure sufficient access points are in place to facilitate future leak detection/ location surveys.

Consider ductile iron pipe for the primary main line material used for new installation and main replacement. As the production cost of water increase, the need for routine system-wide leak detection surveys will also increase. Leak sounds generated in metallic pipe are louder and have a tendency to travel further than those developed in non-metallic pipe. Ductile iron pipe has a proven history of long service life and its sound carrying characteristics for leak detection are far superior to any other type of pipe material.

Your efforts and timely repair of the leaks discovered in this survey have saved a significant amount of precious water. Our thanks to all the staff for your efforts in helping to conserve the Edwards Aquifer.

Sincerely,

John E. Gapinski
Leak Detection Technician I

James R. Shipley
Leak Detection Technician II